

Can psychological distress be detected by response to a needle stick?

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The purpose of this study was to determine whether an exaggerated response to a mildly painful stimulus would reflect abnormal levels of psychological distress in patients and, conversely, whether patients who show abnormal levels of psychological distress would have a low tolerance for a mildly painful stimulus. A total of 101 patients were given a mildly painful stimulus (30-gauge needle stick) and asked to record the amount of pain they felt on a scale of 0 to 10 (0 = no pain, 10 = severe pain). The mean response to the needle stick was a 1.9 on this scale. There was no gender difference, and the average did not change with increasing age. Psychological testing showed that 18% of the 101 patients had psychological distress prior to the needle stick. The pain ratings to needle stick of these 18 patients were not significantly different

than those of patients without psychological distress (2.3 vs 1.9 on the scale). Seven percent of patients had a very low tolerance for pain (pain score of ≥ 7). Evaluation of the psychological testing results on these patients showed no significant difference compared with known normal psychological values. Therefore, the assumption that patients who overrespond to a mildly painful stimulus have psychological distress is not valid. The results of this study suggest only that patients who overrespond to a needle stick have a low tolerance for pain. Furthermore, it is not valid to assume that patients who have psychological distress, poor coping abilities, or marked stress will respond in an exaggerated fashion to a mildly painful stimulus.

It is well known that people who are in psychological distress can have poorer surgical outcomes than patients not in distress (1). The literature of cosmetic surgery, temporomandibular joint surgery, and spine surgery is replete with reports showing that preoperative psychological distress is a factor in poor surgical outcome (2–8). It is difficult to detect distress in patients by simple observation, and it is impractical to do preoperative psychological testing on all surgical patients. What if, however, patients' levels of psychological distress could be inferred from their responses to a mildly painful stimulus? For example, if a patient showed a very low threshold to a minor stimulus (e.g., screamed loudly and cried after a needle stick), would this be indicative of marked psychological distress? Likewise, if a patient had a high threshold to a stimulus (i.e., minimal response to a needle stick), would this indicate minimal psychological distress?

The purpose of this study was to evaluate patient responses to a mildly painful stimulus (30-gauge needle stick) and correlate these responses with results of a psychological screen sensitive for psychological distress. Specifically, the study addressed the following questions: 1) do patients with a low pain threshold (i.e., exaggerated responses to minor painful stimuli) show high levels of psychological stress on psychological testing? and 2) do patients who show abnormal results on psychological distress testing consistently show low pain thresholds (i.e., exaggerated responses to painful stimuli)?

If it were possible to detect patients with psychological distress preoperatively by simple means, treatment could be directed toward reducing stress, and the incidence of poor outcomes might be decreased.

METHODS

Subjects enrolled in the study were patients referred to the Baylor Pain Center for nerve block for treatment of either acute or chronic pain. A total of 101 patients, 57 women and 44 men ranging in age from 27 to 87 years, participated in the study. No patient had a psychiatric disorder or was currently seeing a psychiatrist. All patients were informed of the study and agreed to participate. All patients were given a psychological screen (modified West Haven-Yale Multidimensional Pain Inventory) prior to receiving any treatment. This 8-item instrument designed for patients with chronic pain measures pain intensity, perceived interference by pain in life activities, emotional distress, and problems in coping (9). A total score summarizes the 4 subscales. Normative data from 584 initial visits to the pain center were utilized for comparison. Patients were then given a 30-gauge needle stick in the hand or forearm. The needle sticks were all administered by the same person to try to make the stimulus consistent from patient to patient. Following this, patients were asked to rate the sensation induced by the needle stick on a scale of 0 to 10 (0 = no pain, 10 = severe pain). Unusual grimace or posturing activity was also recorded. Results were compared, and statistical correlation was considered significant at $P < 0.05$.

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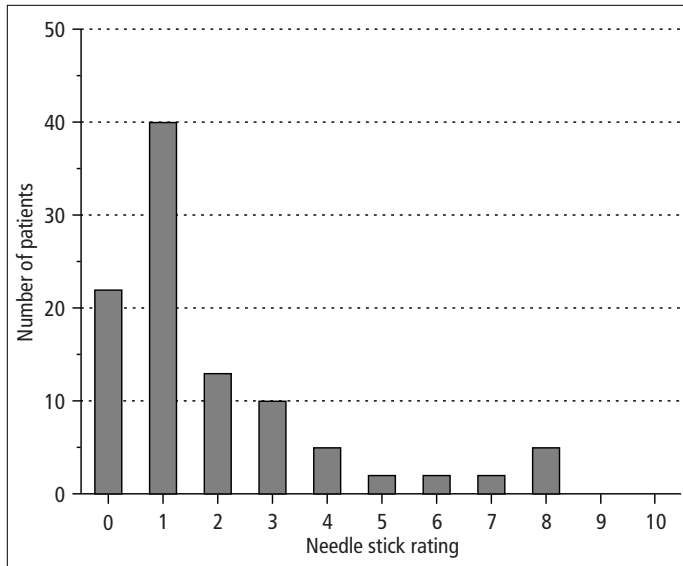


Figure 1. Patient response to needle stick on a scale from 0 to 10 (0 = no pain; 10 = severe pain).

RESULTS

The distribution of responses to the 30-gauge needle stick on the scale of 0 to 10 (0 = no pain, 10 = severe pain) is recorded in *Figure 1*. The mean response to the 30-gauge needle stick was 1.9. Seventy-three percent of patients responded to the 30-gauge needle stick with a score of ≤ 2 . Seven percent of patients described the needle stick pain as ≥ 7 (i.e., low pain tolerance), while 22% described the pain as 0 (i.e., high pain tolerance). There were no statistically significant gender or age effects.

Of the 101 patients in the study, 18 (18%) met criteria for abnormal psychological distress prior to the needle stick. Psychological distress was defined as a score $>90\%$ of the normative sample on either the Total Score or Distress scales of the modified West Haven-Yale Multidimensional Pain Inventory. Slightly more women than men scored in the range indicating a high level of psychological distress (10 vs 8).

No statistically significant relationship was found between perceived needle stick pain and either the Distress scale ($r = 0.17$) or the Total Function scale ($r = 0.11$) on the West Haven-Yale Multidimensional Pain Inventory (*Figure 2*). The 18 patients with a high level of emotional distress (total score >10 on the psychological test) did not report higher pain scores with needle stick (mean, 2.3) than the general group (mean, 1.9). Conversely, the 7 patients with very low pain thresholds (needle stick pain ≥ 7) did not report higher levels of psychological distress (mean, 8.3) than the general group (mean, 6.9).

DISCUSSION

The purpose of this study was to determine whether patients who had a very low tolerance for pain also had abnormal levels of psychological distress and, conversely, whether patients who showed abnormal distress on psychological testing also showed exaggerated responses to a mildly painful stimulus. One of the difficulties in performing this type of study has been getting patients to complete long psychological tests simply to receive a mildly painful stimulus. To assist in this process, we designed a screening version of the West Haven-Yale Multidimensional

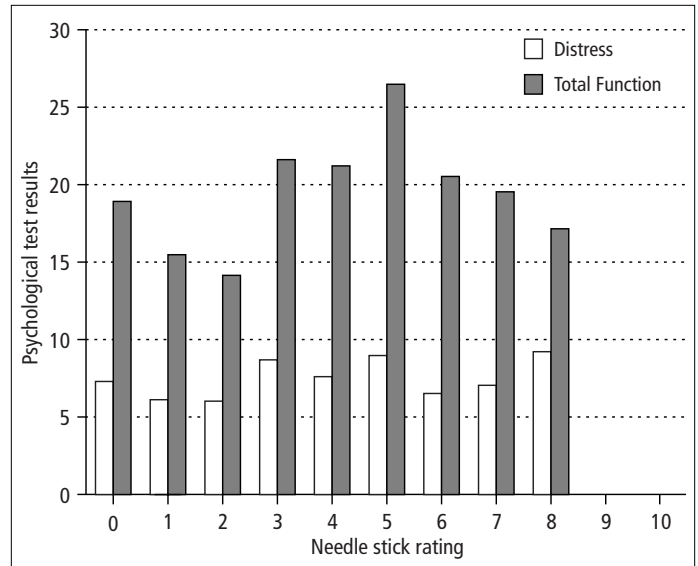


Figure 2. Psychological scores corresponding to each needle stick rating (0 to 10). The mean Distress level was 6.9; values of 10.2 (1 standard deviation above mean) and higher are considered abnormal. The mean Total Function level was 17.4; values of 25.0 (1 standard deviation above mean) and higher are considered abnormal. No correlation was seen between either Distress score or Total Function score and needle stick rating level.

Pain Inventory. This instrument has been extensively evaluated and found to be a useful measure of psychological distress in patients with pain. It has correlated with other well-established measures of distress such as the Chronic Pain Inventory, Beck Depression Inventory ($r = 0.69$, $P < 0.05$), and Beck Anxiety Inventory ($r = 0.51$, $P < 0.05$) (10).

Several interesting findings could be seen in analyzing results of this study. First, the average response to a 30-gauge needle stick was a 1.9 on a scale of 0 to 10 (0 = no pain, 10 = severe pain). This could be a useful way to measure a patient's pain threshold. By simply anesthetizing the skin with a 30-gauge needle prior to starting an intravenous line and asking the patient to rate the pain on a scale of 0 to 10, a pain tolerance could be established. A patient response of ≥ 2 would indicate a lower-than-average tolerance for pain; that patient may require larger doses of analgesic than the average patient.

It was also interesting to note that there was no gender difference in response to a mild pain stimulus. There was no change in response to a mild stimulus with increasing age.

The hypothesis that patients with a low pain tolerance have high psychological distress levels was not supported by this study. Patients with a low pain tolerance (who responded to a 30-gauge needle stick with a pain score of ≥ 7) had normal psychological testing results. In other words, patients with an exaggerated response to pain did not show abnormal distress on psychological testing. Patients who showed a very high tolerance for pain (pain score of 0) also had normal psychological testing results.

Conversely, patients with high levels of psychological distress as measured by the modified West Haven-Yale Multidimensional Pain Inventory did not show exaggerated responses to the mildly painful stimulus with a 30-gauge needle. These same results were shown by Flor and Turk in a group of patients with chronic pain due to failed back syndrome (11). In contrast, Block et al found that in patients undergoing discogram, exaggerated pain report

was related to results on several scales of the Minnesota Multiphasic Personality Inventory (12). They found that elevated scores on scales 1 (Hypochondriasis) and 3 (Hysteria) correlated significantly with exaggerated pain response. These measures appear to be related more to somatic reactivity and somatic preoccupation than to emotional distress. In fact, these scales may be quite elevated in many patients when depression and anxiety scores are actually low.

Therefore, the assumption that patients who overrespond to a mildly painful stimulus have psychological distress is not valid. On the basis of the results of this study, we could say only that patients who overrespond to a needle stick have a low tolerance for pain. Moreover, it is not valid to assume that patients who have psychological distress, poor coping abilities, or marked stress will respond in an exaggerated fashion to a mildly painful stimulus.

CONCLUSION

It is easy for physicians and nurses to assume that patients with a very low pain threshold are psychologically different from other patients. The clinical implication is to treat these patients differently, with a tendency to overuse sedatives or antidepressants. The results of this study show that this is not the case. Patients who show exaggerated responses to mildly painful stimuli do not have a higher incidence of psychological distress, anxiety, or depression than other patients. They simply have a lower tolerance for pain. Rather than overusing sedatives or antidepressants, these patients probably would benefit by sim-

ply receiving larger doses of analgesics because of their low pain thresholds.

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